

REMARKS

Claims 1-19 were pending in this application prior to entry of this Amendment. By this Amendment, new claims 20-23 are added.

Specification:

The Examiner objects to the disclosure because of two informalities. Accordingly, Applicant amends the specification to correct the informalities and requests that this objection be withdrawn.

Claim Objections:

The Examiner objects to claim 9 because he asserts that the term “optical fiber” should be changed to --optical fiber ribbon--. Accordingly, Applicant amends claim 9 and requests that the objection be withdrawn.

Drawings:

The Examiner asserts that Figure 1 should be labeled as -- PRIOR ART--. The Examiner also objects to the drawings under 35 U.S.C. §1.83(a) because he states that the drawings must show every feature of the invention specified in the claims. In particular, the Examiner asserts that an axial member formed from a wound piece of composite tape is not shown. Further, the Examiner asserts that a protective sheath formed from a wound piece of composite tape is not shown.

Accordingly, Applicant submits the enclosed Proposed Drawing Corrections that label Figure 1 with a Prior Art legend and more clearly indicate the axial member and protective sheath as being formed from a wound piece of composite tape, and requests that the objection to the drawings under 37 C.F.R. §1.83(a) be withdrawn.

Oath/Declaration:

The Examiner asserts that the oath or Declaration is defective because it is non-initialed and/or non-dated alterations were made thereto. In response, Applicant submitted a substitute Declaration on June 7, 2002, and requests the Examiner to acknowledge the same.

35 U.S.C. §103 - claims 1-5, 10 and 17-19:

The Examiner rejects claims 1-5, 10 and 17-19 under 35 U.S.C. §103(a) as being unpatentable over Ray et al. (U.S. Patent No. 5,440,665 [hereinafter "Ray"]) in view of Nave et al. (U.S. Patent No. 5,343,549 [hereinafter "Nave"]) and Bringuier et al (U.S. Patent No. 6,304,701 [hereinafter "Bringuier"]). Applicant respectfully traverses the rejection in view of the following remarks.

To establish a *prima facie* case of obviousness, the Examiner must show that the prior art references, when combined, teach or suggest all of the claim limitations. See MPEP §2143. Applicant respectfully submits that the references cited above by the Examiner fail to teach or suggest all of the claimed features as set forth in the present application. Specifically, in regard to claim 1, a plurality of stacks are recited which are stranded to be radially positioned within

said outer protective sheath. Further, claim 1 recites wherein “each of said plurality of stacks includes a plurality of buffer tubes.” (Emphasis added.) The Examiner turns to Ray for an alleged disclosure of an outer protective sheath (31), and a plurality of stacks (48, Figure 13). The Examiner asserts that the plurality of stacks are stranded to be radially positioned within the outer protective sheath, and that each of the plurality of stacks includes a plurality of buffer tubes (26). The Examiner further goes on to assert that each buffer tube contains an optical fiber.

Applicant respectfully submits that the Examiner’s interpretation of Ray does not teach or suggest the present invention. Specifically, the element that the Examiner applies against the claimed plurality of stacks, i.e., 48, does not properly read on the recited stacks. This is because the recited stacks are described as each including a plurality of buffer tubes. However, in Figure 13, the eight circular members that surround the central element 27 are individual buffer tubes and not stacks containing a plurality of buffer tubes. These individual buffer tubes 26 each contain optical fibers. Thus, at best, the Examiner has shown a grouping of eight buffer tubes that are radially positioned around element 27. This does not teach or suggest a plurality of stacks wherein each stack contains a plurality of buffer tubes.

It appears that the Examiner is interpreting reference numeral 26 as representing the individual smaller circles, each within the respective larger tubular objects that surround the axial member 27. The Examiner will better appreciate Applicant’s position with reference to Figure 8. As shown in Figure 8, reference numeral 26 is clearly pointing to individual buffer tubes (eight buffer tubes wrapped around element 27) and not pointing to elements within the tube.

Also Ray at column 13, lines 23-25, discloses that an interior of an elongate tube 55' may be filled with a gel (not shown) to prevent movement of spliced together fiber portions 50 therein. The spliced together fiber portions 50 are shown in Figure 17. These fibers are also shown as being inside buffer tube 26. Thus, element 26 is an individual buffer tube and, as shown in Figure 13, there are eight individual buffer tubes surrounding the axial member 27. Each of these buffer tubes is filled with optical fibers.

Accordingly, what the Examiner is applying against the claimed invention is not a plurality of stacks, each radially positioned within an outer protective sheath, wherein each of the plurality of stacks includes a plurality of buffer tubes. Instead, the Examiner is applying merely a plurality of buffer tubes. Thus, at most, the Examiner could argue that one stack is shown; however, there clearly is not a plurality of stacks disclosed, as required in the claim.

The Examiner turns to Nave for an alleged disclosure of a wound piece of composite tape. Further, the Examiner turns to Bringuier for an alleged disclosure of an axial member formed from a wound piece of composite tape. However, the reliance on Nave for an outer sheath formed from a wound piece of composite tape, and Bringuier for an axial member allegedly formed from a wound piece of composite tape, does not make up for the deficiencies of Ray regarding the plurality of stacks that are stranded, and which include a plurality of buffer tubes. For at least this reason, Applicant respectfully submits that the Examiner's assertions do not support the 35 U.S.C. §103 rejection.

As an initial point, the polyimide tape 9 of Nave is not taught or suggested to be made of a composite material. Specifically, polymer materials are composed of long-chain molecules often with carbon-to-carbon covalent bonds as the backbone. In contrast, composite materials are material compositions where two or more material sub-elements work together while retaining their respective characteristics in the mixture.

Further, Applicant submits that there is clearly no motivation to combine Ray and Nave in the manner asserted by the Examiner. Specifically, the alleged tape 9 in Nave is described as being a flame-resistant polyimide tape 9 that is positioned between layers 8 of aramid yarns. The Examiner asserts that it would have been obvious to take the flame resistant tape 9 of Nave and use it to replace the outer sheath 31 of Ray. However, there is clearly no motivation to make this combination. As shown in Figure 5 of Ray, the outer sheath 31 is used as an outer structural support element that includes a shoe 41a positioned underneath the outer sheath 31 and a threaded stud 41b protruding through the sheath so as to engage with a top plate 41c. A locking nut 41d is then applied to the threaded stud 41b.

One skilled in the art would not have taken the tape 9 of Nave and used it to replace the outer sheath 31 of Ray because the tape 9 clearly would not have the physical properties to be clamped down and supply the support needed to engage with the threaded stud 41b and nut 41d. Both of these elements, i.e., 9 of Nave and 31 of Ray, are made of different materials and have structurally different uses. In particular, the outer sheath 31 of Ray must be designed so as to be strong enough to cradle and support multiple buffer tubes, and to withstand the forces applied by

the nut 41d. Accordingly, one skilled in the art would not have substituted the flame resistant polyimide tape 9 of Nave for the outer protective sheath 31 of Ray.

Thus, not only does the combination of the references fail to teach all of the claimed elements because Ray does not teach a plurality of stacks that include a plurality of buffer tubes, and because none of the references teach a composite tape, but also there is no motivation to combine the references in the manner asserted by the Examiner.

In regard to claims 17-19, the Examiner asserts that the claimed method language is counterpart of the apparatus claimed. Therefore, the Examiner concludes that it would have been obvious to one of ordinary skill to develop the claimed method. Applicant respectfully submits that the applied references do not teach the claimed method. Specifically, claim 17 recites providing a piece of composite tape and applying gel to a first side of the composite tape. The Examiner has not shown or described where such a procedure is taught or suggested in the references. Further, claim 17 describes depositing an optical fiber on the composite tape. However, the element that the Examiner refers to as being composite tape, i.e., reference numeral 9 of Nave, is not taught to have a gel applied to a first side thereof, nor is it even suggested to deposit an optical fiber on element 9. In *contradistinction*, the optical fibers of Nave (element 3) do not make any contact with the tape 9.

Accordingly, Applicant submits that claims 1 and 17 are patentable over Ray in view of Nave and Bringuier, and the rejection of these claims should be withdrawn.

Furthermore, with regard to claim 2, the Examiner states that it would have been an obvious matter of design choice to modify Ray so that each of the plurality of stacks is formed to have one of a triangular and trapezoidal shape. However, as described above, Ray does not disclose a plurality of stacks, as in claim 1. Thus, because it does not disclose a plurality of stacks, there clearly cannot be any motivation to form a plurality of stacks to have one of a triangular and trapezoidal shape.

Moreover, claim 5 recites that said plurality of stacks each have an outer portion formed from a wound piece of composite tape, which respectively supports said plurality of buffer tubes within each of said stacks. Again, because Ray fails to disclose a stack, as recited in claim 1, the recitations of claim 5 cannot be taught or suggested by the references.

With regard to claim 10, the Examiner asserts that Bringuier discloses an axial member 21 that is formed from a wound piece of composite tape 22. However, element 22 of Bringuier is described as being a water swellable tape. The Examiner appears to be taking the position that a water swellable tape makes obvious a composite tape. However, as one skilled in the art would appreciate, these elements are different. For example, as described in the specification on page 5, lines 6-9, the composite tape is disclosed, for example, and not by limitation, as being made by combining fibers of an organic mesh-type substrate with inorganic dot type ceramic materials. This is different than a water swellable tape. Further, the composite material of the present invention is a strong material capable of withstanding loads in directions along the length of the cable (for contraction and expansion due to temperature changes) and perpendicular to the cable,

to protect from crash loads. Moreover, composite materials allow a blending of physical properties of separate components. For example, carbon fiber-reinforced plastics combine the high strength and stiffness of the fiber with the low weight and fracture resistant aspects of a polymeric matrix. Such physical aspects are not taught by the water swellable tape, which further differentiates the invention from the prior art.

A water swellable tape would not have taught, to one skilled in the art, a composite tape, as in the present invention, that has adequate tensile and compression properties for its claimed applications. Therefore, Applicant submits that dependent claims 2-5, 10, 18 and 19 are patentable over the applied references because of their individual recitations, in addition to their respective dependencies upon independent claims 1 and 17. Accordingly, Applicant respectfully requests that the Examiner withdraw the rejection of these claims.

35 U.S.C. §103(a) - claims 6-9:

The Examiner rejects claims 6-9 under 35 U.S.C. §103(a) as being unpatentable over Ray in view of Nave as applied to claims 1 and 4 above, and further in view of Hardwick, III et al. (U.S. Patent No. 6,321,031 [hereinafter "Hardwick"]). Applicant respectfully traverses this rejection in view of the following remarks.

The Examiner submits that Ray in view of Nave discloses all of the limitations of claims 1 and 4, as stated above. As an initial matter, Applicant submits that claims 6-9 are patentable

over the applied references at least by virtue of their respective dependencies on claim 1 because Hardwick does not make up for the deficient teachings of Ray and Nave.

The Examiner relies on Hardwick for an alleged teaching of buffer tubes having an outer portion formed from a wound piece of composite tape. In doing so, the Examiner refers to the buffer encasement 36d, and asserts that it is formed from a wound piece of composite tape and refers to Figure 9 and column 10, lines 62-64. However, this disclosure does not teach a buffer tube that has an outer portion formed from a wound piece of composite tape. Instead, it discloses optical fiber ribbons 34 enclosed by a piece of polymeric film or tape. This disclosure of the polymeric tape does not teach the present invention because one skilled in the art would not have been taught the claimed composite tape from a disclosure of polymeric film.

By definition, a polymer is not a composite material, as described above. Further, Hardwick does not provide any indication that the polymeric film is used in any way to form a composite material. Thus, Hardwick does not disclose the claimed composite tape and does not teach the present invention. Accordingly, Applicant submits that claims 6-9 are patentable over the applied references at least by virtue of their respective dependencies on independent claim 1, in addition to their individual recitations.

35 U.S.C. §102 - claim 11:

Claim 11 is rejected under 35 U.S.C. §102(b) as being anticipated by Barrett (U.S. Patent No. 5,917,977). Applicant respectfully traverses this rejection in view of the following remarks.

The Examiner asserts that Barrett discloses a first buffer tube 18 formed from a wound piece of composite tape and an optical fiber disposed within the buffer tube. The Examiner also asserts that the composite tape is represented by element 16 and is described in column 3, lines 45 and 46. The buffer tube is described as being formed of a plastic material such as polypropylene. This is not a composite tape.

The Examiner then refers to element 16 as being the wound piece of composite tape. Applicant points out that the buffer tube 18 of Barrett is not formed from element 16, but instead, the buffer tube 18 contains within itself element 16. Element 16 is described as being a water blocking tape or yarn, or a dry water blocking material, for example, a hydrophilic powder dispersed therein (see column 3, lines 42-43).

One skilled in the art would not have been taught or suggested a composite tape, as in the present invention, in view of the disclosed water blocking tape, yarn or powder. Thus, not only is the buffer tube 18 not formed from element 16, which the Examiner applies against the claimed composite tape, but also element 16 is not even a composite tape. Instead, it is either a powder or a water blocking tape or yarn, none of which would be considered by one skilled in the art to be a composite tape.

Accordingly, Applicant respectfully submits that claim 11 is not anticipated by Barrett, and requests that this rejection be withdrawn.

35 U.S.C. §103(a) - claims 11-14 & 16:

The Examiner rejects claims 11-14 and 16 under 35 U.S.C. §103(a) as being unpatentable over Nave in view of Barrett. Applicant respectfully traverses this rejection in view of the following remarks.

The Examiner turns to Nave and alleges that a first and second buffer tube are disclosed which are enclosed by an outer jacket formed from a wound piece of composite tape surrounding the first and second buffer tubes. Accordingly, the Examiner appears to be starting his analysis with dependent claim 13 and applying the polyimide tape 9 against the claimed outer jacket formed from a wound piece of composite tape.

However, the tape 9 of Nave is not a composite tape and would not have taught one skilled in the art to use a composite tape. As discussed above, a polyimide tape is not a composite tape. The reference and the Examiner have not provided any indication that the polyimide tape is a composition of two or more material sub-elements that work together while retaining their respective characteristics in the mixture.

The Examiner then acknowledges that Nave does not disclose a buffer tube formed from a wound piece of composite tape and, thus, cannot be used in the rejection of independent claim 11. Accordingly, the Examiner again turns to Barrett for the alleged disclosure of a buffer tube 18 formed from an alleged wound piece of composite tape 16. As discussed above, the buffer tube of Barrett surrounds the water blocking tape or powder 16, but the buffer tube is not formed

from this material, and the material 16 is not a composite tape. Thus, Barrett does not disclose a “buffer tube” formed from a wound piece of composite tape, and cannot be used to make obvious the invention of independent claim 11.

In regard to claim 14, the Examiner asserts that it would have been obvious as a matter of design choice to modify Nave so that each of the plurality of alleged stacks are formed to have a triangular shape. The Examiner asserts that any two combinations of the buffer tubes in Nave could be used to form a stack. However, Applicant respectfully submits that one skilled in the art would not have been taught to take any two of the combinations of Nave and form them in a triangular shape. Furthermore, because Nave discloses a binder layer separating an inner ring and outer ring of buffer tubes, it is not clear how such a triangular shape could be created in Nave. Further, the Examiner’s characterization of the claimed limitation as “obvious matter of design choice” is merely an unsupported, generalized conclusion, and not a reason or showing as required to support the rejection, and thus can constitute reversible error. Ex parte Garrett, 33 BNA’s Patent, Trademark and Copyright J. 43 (1986) (reporting decision of Bd. Pat. App. & Inter. 9/30/86: Appeal No. 580-81).

Accordingly, claims 11-14 and 16 are patentable over the applied references, and the rejection of these claims should be withdrawn.

35 U.S.C. §103(a) - claim 15:

The Examiner rejects claim 15 under 35 U.S.C. §103(a) as being unpatentable over Nave in view of Barrett as applied to claims 1-14 above, and further in view of Eoll (U.S. Patent No. 5,212,756). Applicant respectfully traverses this rejection in view of the following remarks.

The Examiner turns to Eoll for an alleged disclosure of a protective sheath formed from a wound piece of composite tape. The Examiner asserts that such a protective sheath is shown as being element 11 in Figure 4. Applicant respectfully submits that such a disclosure does not make up for the deficient teachings of the prior art references. Specifically, element 11 is described as being a plastic member (see column 3, line 5). Again, a plastic material, without anything more, does not teach a composite material.

The Examiner then asserts that it would have been obvious to take this plastic element 11 and insert it into the invention of Nave. Presumably, the Examiner is replacing element 11 of Nave with the plastic member 11 of Eoll. However, because the plastic member of Eoll is not disclosed as being a composite tape, the disclosure of Eoll does not meet the requirement of the claim. Furthermore, element 11 of Eoll is disclosed as being inside element 9, as shown in Figure 4. However, the Examiner asserts that it would have been obvious to take this inner element 11 of Eoll and replace the outer element 11 of Nave. Applicant submits that there is clearly no motivation to do so because the plastic member in Eoll is taught to be an inner member, not an outer member, as is element 11 of Nave.

Accordingly, Applicant respectfully requests that the rejection of claim 15 under 35 U.S.C. §103(a) be withdrawn because of its dependency on claim 11, in addition to its individual recitations.

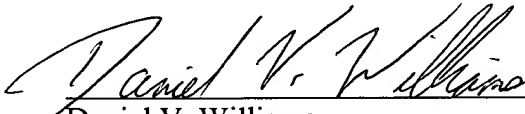
New Claims:

Applicant adds new claims 20-23 to obtain more varied protection for the invention, and submits that they are patentable over the applied references. For example, and not by limitation, the applied references do not teach or suggest the claimed tape made of a wound piece of composite material, in addition to the other recitations of claims 20-23.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, he is kindly requested to contact the undersigned attorney at the local telephone number listed below.

Applicant hereby petitions for any extension of time that may be required to maintain the pendency of this application, and any required fee (except the Issue Fee and/or Publication Fee) is to be charged to our Deposit Account No. 19-4880.

Respectfully submitted,


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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

The specification is changed as follows:

Page 5, first full paragraph:

As shown in Figure 3, a buffer tube 18 may also be formed to contain optical fiber ribbons 20. The optical fiber ribbons 20 allow for an increase in fiber packing density within the given space created by the rolled composite tape 12. This is advantageous as higher packing densities allow for more fiber to be placed in a given diameter cable and thus more efficient use of existing cable ducts. Further, use of the optical fiber ribbons 20 provide easier fiber identification, maintenance and splicing when working on the fibers. The size of the optical fiber ribbons 20 may be varied depending on the particular application. Also, similar to the embodiment of Figure 2, a gel or foamy glue 16 may be provided within the buffer tube 18 for filling the air gaps and positioning the optical fibers ribbons 20. As shown in Figure 3a, it may also be advantageous to provide the optical fibers 14 or the optical fiber ribbons 20 on an outside portion of the rolled composite tape 12, such that the composite tape 12 is rolled to form a tube and optical fiber ribbons ~~18~~ 20 are positioned radially or helically stranded on the outside portion of the rolled composite tape 12. This configuration provides particular benefits because stacks of

ribbons are positioned on top of a light-weight cylinder made of a composite material. The cylinder is empty, thus the cable weight is reduced. Also, traditional thermoplastic or a new composite-tape layer can be used as an outer jacket to enclose the stacks of ribbons. In addition, the cavity of the hollow central tube can be used to run electric wires, or other elements typically found in hybrid telecommunication and power cables. Another benefit of this embodiment is that, when under radial compression, the hollow central tube does not embed into the ribbons, but rather deforms, and protects the fibers from excessive stress.

Page 6, second full paragraph:

A gel or foamy glue 26 may be used to fill in gaps between the buffer tubes 18 and to hold the stack 22 together. Examples of suitable gel formulations include gels comprised of mineral oils and/or synthetic polyolefin oils combined with a polymeric thixotropy modifier or pyrogenic silica. Commercially available gel compounds include Mastergel R-1806 and R-1806LT. By bundling together multiple buffer tubes 18 to form a stack 22, a self-supporting effect is created that permits the optical fiber ribbons ~~18~~ 20 to carry an increased amount of external load. Thus, when multiple fibers are disposed in a tube, they can carry loads themselves, with a minimized contribution from additional strength members, so as to form a self-supporting ~~mechanism~~ structure. Also, when the number of fibers per tube is increased, the required strength contribution from a fabric-composite wall is lessened, so the wall thickness can be reduced. This results in a reduction of reliance on expensive and space consuming strength

members, which are traditionally used to provide stability and support to an optical fiber configuration. Although Figure 4 shows buffer tubes 18 containing optical fiber ribbons 20, it will be appreciated that various configurations of optical fibers can be used within the buffer tubes.

Page 7, third full paragraph:

The optical fiber configuration 28 may also have an axial member 34 that is centrally positioned with respect to the outer protective sheath 30. The axial member 34 is used to provide further support to the optical fiber configuration 28, and can be used to hold and support additional optical fibers or other elongated elements such as electric power wire or power cable. In an effort to reduce the amount of thermoplastic present in the optical fiber configuration 26 28, the axial member may be formed from rolled composite tape, as described above with respect to the buffer tubes 10 and 18, and contain optical fibers 14, which may take the form of optical fiber ribbons 20.

Page 8, first full paragraph:

With reference to Figure 6, a method of making an optical fiber configuration according to the present invention will be discussed. First, the composite tape 12 is positioned in an unrolled condition. A gel or foamy type glue 38 is applied to an open face 36 of the composite tape 12. Optical fibers are then positioned on the composite tape 12. It is noted that Figure 6 shows the optical fibers in the optical fiber ribbon configuration ~~18~~ 20, as discussed above with

reference to Figure 3; however, various ~~configuration~~ configurations of optical fibers may be used. After the optical fiber ribbons 18 20 are placed on the composite tape 12 containing the gel, the composite tape 12 is rolled or wrapped around the fibers so that a buffer tube 18 configuration is formed. A similar rolling process is then performed to form the stacks 22, and then to form the optical fiber configuration that is described with reference to Figure 5. The tape can be helically wrapped, or may be applied longitudinally.

IN THE CLAIMS:

The claims are amended as follows:

9. (Amended) The optical fiber cable configuration of claim 7, wherein said optical fiber ribbon is surrounded with gel.

New claims 20-23 are added.